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# INTERESTS IN RELATION TO INTELLIGENCE

A STUDY OF THE RELATION OF THE INTERESTS OF SCHOOL  
CHILDREN TO THEIR MOTIVATION AS SHOWN IN THE CHOICES  
OF SCHOOL PLANS AND OCCUPATIONAL PROSPECTS

BY

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## INTERESTS IN RELATION TO INTELLIGENCE

▲ STUDY OF THE RELATION OF THE MENTAL STATUS OF SCHOOL CHILDREN TO THEIR MOTIVATION AS SHOWN IN THE CHOICES OF SCHOOL PLANS AND OCCUPATIONAL PREFERENCES.

By LOUISE E. POULL, PH.D.

### INTRODUCTION AND REVIEW OF PREVIOUS RESEARCHES

The study of interests is essential to the study of human nature. Interest is an important factor in every analysis of mental functioning. "My experience is what I agree to attend to. Only those items which I notice shape my mind—without elective interest experience is an utter chaos. Interest alone gives accent and emphasis, light and shade, background and foreground—intelligible perspective in a word. It varies in every creature but without it the consciousness of every creature would be a gray chaotic indiscriminateness impossible for us to conceive."(1)\* "We may say that three general factors of advantage determine the power of any stimulus to attract attention. There is the native factor consisting of change, intensity, striking quality and form; there is the factor of habit, dependent on past experience; and there is the factor of present interest and desire."(2) Thorndike (3) has further analysed interest into "instinctive likes" and "readiness" for neurone condition. Scientific research on neurone conduction will no doubt lead eventually to a fuller understanding of the manner in which this readiness is brought about.

Walseman(4) describes interest as the subjective condition of

\* Figures refer to numbers in the bibliography.

cognition. Its importance both as a source of energy and as a means of conservation of energy is explained by him in analysing the nature of interest. It consists of an inner need to pursue its object, combined with a joyous exaltation and a feeling of buoyancy. It contains within itself a constant stimulus to further endeavor, positive direction and balanced tension. It provides, without expenditure of energy, for the control of moods, desires, and passions.

It remains for the laboratory psychologist to put this important element of mental functioning in proper form for scientific observation; to get a cross section, so to speak, for analysis. Folsom(5) expresses the inadequacy of treating character traits as general attributes of mind. ".... they fail to discriminate different situations, and they assume too great generality. .... Lack of concentration may be simply inability to concentrate on certain kinds of work." The study of interest, then, becomes, in the laboratory, the study of interests, and these can be observed only in their manifestations. Laboratory psychology is concerned with the age at which they appear, their permanence or transitoriness, their power of motivation, their relation to abilities and capacities.

Folsom(5) endeavored to find the relation of interest to other forms of motivation. He classified the motives for vocational choices taken from the questionnaire responses of 206 distinguished men from "Who's Who" and those of 155 upper classmen of a small college. These motives were: 1. Intrinsic interest; 2. Satisfactions not intrinsic: Advantage, Ambition, and Desire for social contacts; 3. Moral motives: Service and Duty; 4. Fitness; 5. Opportunity in the field; 6. Financial, including necessity; 7. Influence or tradition; 8. Elimination. "That nearly half of the motivation for vocational choice among college men is sheer liking or interest for the work seems established. It is evident that this motive plays a much greater part in technical and scientific occupations."

The influence of the father's occupation on the vocational interest of the child was studied by Elizabeth T. Sullivan(6) in the San Jose High School in 1918. The Barr Rating Scale for Vocations was used in making the comparison. "It will be seen that the students choosing a Class 2 vocation have a tendency to choose the same in from one to four points below the father. Students choosing a Class 3 vocation make a choice ranging from

one point below that of the father to three points above, while those choosing a Class 4 vocation range in choice from two points below to two points above that of the father. Fifty per cent. of the students choosing a Class 3 vocation make the same choice as the father. For the remaining per centages there is a decided tendency for students to make a choice above that of the father. When the student's choice of vocation is below that of the father, the choice is always of the lower class vocations.

..... We may conclude that the father's vocation does not inspire the student in the choice of his vocation. On the contrary, it is possible to conclude that the intimate knowledge he has of the limitations of his father's vocation make clear to him one vocation to be avoided." Group 1 in this scale is the lowest and group 7 the highest.

Barr(11) reports the correlation of the intelligence of the child according to the Stanford-Binet Scale with the occupational rating of the father worked out on 104 cases. The correlation was .69 with P. E. .035.

A study of group differences between public school children for various appeals to age and sex is reported by Gertrude Mary Kuper.(12) Nine pictures of uniform size and finish were chosen to represent nine appeals. She found a sex difference in the order of preference. "The girls' order was: 1, religion; 2, patriotism; 3, children; 4, pathos; 5, animals; 6, sentiment; 7, landscape; 8, the heroic; 9, action. The last two were decidedly lowest in the scale and the first three were quite clearly highest for all ages; but the picture representing these nine curves was one of bewildering intersections as the values changed from year to year. The boys' order was: 1, religion; 2, patriotism; 3, action; 4, the heroic; 5, pathos; 6, animals; 7, sentiment; 8, landscape; 9, children. The boys' chart representing the curves for these appeals showed greater agreement from year to year."

The change of attitude from childhood to adolescence is clearly outlined in the children's expressions from year to year. "At the ages between 11 and 13 the critical spirit made its first appearance among the girls. Only at fourteen did it occur in the boys' comments. .... At 15, the remarks become more laconic .... this age is marked by the first signs of hesitation in speaking of pictures of sentiment."

The indication is that interests are well defined at an early age and that it is possible to obtain objective measures of them.

May(13) emphasizes the need for taking into consideration the "vocational ideals" of children. He defines these ideals as desires which may become separated from reality on account of the apparent hopelessness of their materializing. Expressions of these ideals would, according to Dr. May, help us to understand the inner drives of the child, his longings to work out capacities he feels but does not understand, and in working out which he would be rounding out his personality. He believes it possible, beginning with the third year of school, to use a definite method, and his experiment will, no doubt, throw light on the many difficulties of using this method in the future curriculum.

Kent(14) inquired into the early constructive interests of 72 talented engineers. "With regard to interest taken in actual performance of work during boyhood, the answers affirming such interest generally do so with a positiveness and detail which marks it as the dominant one of the period.

At least 79 per cent. did more or less constructive work before reaching the age of 17. Fifty-four per cent. did such work as proves the possession during boyhood of decidedly exceptional constructive ability."

Forty-four per cent. of the whole or four-fifths of this talented section did work which indicates that this talent and their tastes already possessed a decided bent towards machine construction.

Thirty per cent. of all built steam engines, thus proving and defining in a peculiarly distinct and conclusive way both an already developed taste for mechanical engineering as such and their possession during boyhood of very exceptional talent for it.

In this field, at least, we have evidence that early interest fore-shadows future ability."

In 1912 Thorndike made a study of the "Permanence of Interests and their Relation to Abilities.(6) He summarizes his results as follows; "I have computed the resemblance between interest in the last three years of the elementary school and capacity in the college period as a partial measure of the extent to which early interest could be used as a symptom of adult capacity. The average for the hundred individuals is a co-efficient of correlation or resemblance of .60." He found the co-efficient of correlation between the order of ability in the elementary school in seven subjects and their order in the college period to be .65. Combined elementary and High School ability, correlated with college ability by the rank method, gave a co-efficient of .91. In

1917(7) he reports a similar study resulting in the following correlations:

Elementary school interests with high school interests.....	r = 85
Elementary school interests with college interests.....	r = 66
High school interests with college interests.....	r = 79
Elementary school interests with college ability.....	r = 66
Order of interest with order of ability in elementary school, high school and college.....	r = 89

He adds the following comment: "Even if the true resemblances are ten per cent. below, these facts witness to the importance of early interest. They are rather stable features of an individual's constitution and are symptomatic, either as cause or effect, or both, of abilities."

#### NATURE AND SCOPE OF THE PROBLEM

If the interests of children in elementary school subjects are symptomatic of college ability what of the interests in occupations and in recreational activities? When children are leaving the elementary school the practical aspect of interests in occupation is taken into consideration. Secondary education has then been advised for all who are able to put off earning a living, and part time education for those who are ambitious enough to exchange play-time for education. If interests are potent in directing the vital forces can we afford to ignore them during the growing years? For many years the subject of elimination from high school has been under discussion. Van Denberg(8, p. 158) informs us that but one of eight high school entrants succeeds in graduating; that from five-sixths to seven-eighths have no "tangible resultant benefits;" that the high schools are being crowded with thousands eager for some taste of secondary education among whom are a few who can and will work forward to successful graduation under the present sifting process. Yet, with these, who can and will, are more, who can but will not because our process of selection or sifting is crude and defective; and so we lose this latter, equally good, material through the inefficiency of our present methods of selection."

Book(9) draws the following conclusions from his survey of the high schools of Indiana:

"1. That the high schools of the State are not adapting themselves to the inequalities in mental strength shown by their pupils as well as they might.

" 2. That high schools as at present organized and conducted seem to be better adapted to the interests and needs of the girls than the boys. The girls are more rapidly and consistently advanced by the schools, notwithstanding the fact that the boys make better records on our mental tests. This suggests that the high school is either better adapted to the interests and needs of the girls, or that the girls possess characteristics other than general intelligence important for school success not possessed by the boys. . . . ."

These considerations seem to point to the probability that the causes of elimination should be sought farther back in school life. Though the study of elimination from the grades may be basal to any high school inquiry the problem is actually a larger one, namely, the motivation of school children. The question is not only why high schools lose so many students by the way but also, who of the elementary school population goes to high school? Who goes to work without further school plans and who is planning for part time secondary education? What are their special interests and in what degree are these interests related to intelligence? What is the relation not only between intelligence and school plans, but also between interest and failure to fit into the existing school organization.

The causes of truancy are vitally related to the interests and intelligence of school children. Before we had compulsory school laws, natural selection was allowed to operate. Children who could not comply with the minimum standards could leave school and go to work. But under the compulsory school law the child who can qualify for seventh grade is allowed to go to work; the one who has not the capacity for work in the sixth grade is obliged to attend school until he is sixteen years old. These children are not necessarily mental defectives. But they are caught as in a vise between an inflexible law, an inflexible curriculum and their own mental limitations. They are denied the only development that is possible for them, namely, vocational training in accordance with their mental capacities and interests.

There are children who submit to these repressions. Others express their protest in defiant behavior and truancy. Truants are considered by society as juvenile delinquents, parents of truants are fined, and anti-social life attitudes take root. A group of 608 unselected truants taken from the Bureau of Attendance of New York City(15) were ranged according to their

intelligence quotients and were found to have a median I. Q. of 84.6. Only 15 per cent. of this group were above the normal median. A similar study of 30 truants who are also delinquents on other counts was made in 1918 by the Department of Research of Whittier State School, California. The findings showed the same median I. Q. and distribution as the New York City study. When allowance is made for other factors of truancy the fact remains that the large majority of truants are children whose natural capacities and interests are ignored by the present school organization.

The problem is too comprehensive to be solved by intelligence tests alone. An I. Q. is an average and has all the limitations of averages. Two persons with identical I. Q.'s may react in opposite ways to the same stimulus. The general intelligence furnishes the minimum requirement for these reactions but the type of reaction is conditioned by temperament, by individual(16) likes and dislikes. Quoting James once more: "We never make an effort to attend to an object except for the sake of some remote interest which the effort will serve." No one feels more keenly than the examiner who makes mental tests how sterile is this field unless the special capacities, the drives of the individual are taken into account. In individual testing, the laboratory psychologist gives the subject every opportunity to show what is the dominating influence in his life. Without interfering in any way with standardized measures or standardized methods of procedure it is possible to bring out instinctive likes and dislikes; the types of tests in which a certain zest is displayed, the obvious effort in others; success without apparent effort in some, failure in spite of effort in others; spontaneous expressions, and supplementary interviews concerning occupations and recreations, difficulties in adjustment to environment, all serve to bring into relief the distinguishing characteristics of a personality.

In planning the present investigation, effort was made to adapt the method of the individual examination as far as possible to the group examination.

#### OUTLINES AND METHODS OF INVESTIGATION

The purpose of this investigation was to find the relation between general intelligence and children's expressions of their interests in occupations and of their plans for secondary educa-

tion. The main requirements were: valid intelligence tests, spontaneous expressions of preferences, and an unselected group of children of sufficient number to secure statistical reliability.

The three public schools whose populations were the subjects of this study, are located in the same school district of Manhattan. This district is a working man's neighborhood, as is proved by the records of the occupations of the parents. There are only a few cases of professional workers or owners of small shops. We may then assume an equal social status for the group. Public School No. 3, the school for girls, has a larger population than No. 11, the school for boys. To avoid a marked inequality between the number of boys and girls, the 6a class of Public School No. 95, a school for boys, was included. This equalized the numbers and as a 6a class may be regarded as the most representative cross section of a school population, the selection brings in no debatable factor. It is owing to the differences in actual attendance from day to day that the totals of responses to the different tests vary. No effort was made to fill in the gaps caused by absence. The total number of subjects is approximately 1,206; 658 girls and 548 boys.

The investigation was limited to classes 5b to 8b inclusive. The limitations at the lower end is somewhat arbitrary, but we may say, in a general way that in grades below the fifth, the child's mind is so busy adjusting itself to the growing situations of the elementary school that it cannot plan beyond. However, an extension of the study of interests in the lower grades would be desirable.

To obtain valid intelligence ratings for so large a group, careful planning was necessary. It is not assumed that any group method can replace individual examinations in the study of personalities. The plan was rather to see whether, by means of the group method, an approach could be made to an adequate study of a school population. National Intelligence Test A and B, Form 1, were chosen as a basis but it was decided to supplement these by a non-language scale in order to compensate for the low ratings which might result from language difficulties. As year norms were available, the Pintner Non-Language Scale was chosen, the Kelly-Trabue Completion Alpha was added to give additional scope for expression and the Pintner Educational Scale to give an objective measure of school attainment to be

used especially in problem cases. Obviously, the composite rating obtained from the results of four tests, necessitating several visits to each class, is a more reliable indication of intelligence than is the rating of a single test. A detailed account of the testing and of the weights used in the composite is given in a later chapter.

To obviate the difficulties arising from a limited time for response, spelling difficulties of backward children, and also to equalize somewhat the differences in life experience, lists of occupations and of recreations were presented from which they were asked to make three choices. Samples of the questionnaires are given below. The children were instructed to read them carefully before selecting, and to add any occupation or recreation which they preferred if that occupation or recreation were not included in the list. A third questionnaire, also shown below, concerns the family and plans for secondary education.

Write your name here . . . . .

Write your address here. No. . . . . Street.

Which of these would you like best to do? Mark it 1.

Which of these would you like next best to do? Mark it 2.

Which of these would you like next best to do? Mark it 3.

Actor	Electrician	Nurse
Architect	Engineer	Office work
Artist	Engraver	Office helper
Author	Errand-boy	Painter
Automobile mechanic	Factory worker	Photographer
Banker	Farmer	Plumber's helper
Barber	Fireman	Policeman
Bell-boy	Forester	Printer
Blacksmith	Gardener	Printer's helper
Bookkeeper	Housekeeper	Priest
Bricklayer	Insurance	Professor
Business	Janitor	Salesman
Butcher	Judge	Secretary
Car-conductor	Laborer	Shipbuilder
Carpenter	Librarian	Stenographer
Chauffeur	Lawyer	Taking care of a home
Clerk	Mechanic	Teacher
Cook	Mechanic's helper	Teamster
Dentist	Milliner	Telegrapher
Doctor	Miner	Telephone operator
Draftsman	Minister	Typist
Dressmaker	Motor-man	Waiter
Elevatorman	Musician	Worker in laundry

Write your name here .....

Write your address here. No.....Street.....

Which of these do you like best for a good time? Mark it 1.

Which of these do you like next best for a good time? Mark it 2.

Which of these do you like next best for a good time? Mark it 3.

Acting	Gymnasium	Playing with babies
Airplanes	Handball	Playing post office
Animal stories	Holding meetings	Playing volley ball
Automobile driving	Horse back riding	Reading stories
Bicycle riding	Horse races	Reading poetry
Bird stories	Hunting	Ring games
Boat riding	Ice cream parlor	Rope jumping
Bowling	Jackstones	Rowing
Boxing	Jewelry	Shopping
Candymaking	Kites	Singing games
Card games	Kodak	Sculpture
Carving	Listening to music	Spinning tops
Climbing trees	Machinery	Sewing
Collecting bird's eggs	Masquerades	Skating
Collecting bugs	Mechanical toys	Singing
Collecting coins	Modeling	Sliding
Collecting marbles	Visiting	Sledding
Collecting shells	Mountain climbing	Sleighing
Collecting stamps	Movies	Swimming
Concerts	Museums	Swinging
Dancing	Novels	Tableaus
Debates	Opera	Target shooting
Detective stories	Ouija	Tea parties
Dice	Painting	Tennis
Dolls	Picture galleries	Train rides
Dominoes	Picnics	Walking
Drama	Playing baseball	Watching ball games
Drawing	Playing basketball	Wild flowers
Eating candy	Playing house	Wrestling
Embroidery	Playing Indian	Writing stories
Fancy dancing	Playing chess	Writing letters
Fishing	Playing checkers	Writing poetry
Gardening	Playing doctor	Vaudeville
Games of chance	Playing robber	Victrola
Going to circus	Playing school	

Write your name here.....

Write the number of your school here.....

Where do you live? No.....Street.....

How old are you? ..... When was your last birthday?.....

In what country were you born? .....

In what country was your father born? .....

In what country was your mother born? .....

What is your father's trade or business? .....

What is your mother's trade or business? .....

Write here the names of your brothers and sisters. Write ages here.

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Do you expect to go to High School? .....

If you do go to High School, do you expect to go to a Commercial High School? .....

If you do go to High School, do you expect to go to a Manual Training High School? .....

If you do go to High School, do you expect to go to an Academic High School? .....

Do you expect to go to Night School? .....

Write its address here. No.....Street.....

Do you expect to be in school next year? .....

Do you expect to go to work? .....

Do you expect to go to Vocational School? .....

Write its address here. No.....Street.....

Do you expect to go to Continuation School? .....

What do you expect to do for a living at first? .....

What do you expect to do for a living later? .....

- The data, then, comprise the mental age and intelligence quotient according to the four scales, a complete rating derived from the combined results of these scales, the educational rating, the first, second and third choices of occupations and of recreations, the plan for secondary education and for life occupation, the occupation of the father and mother, the order of birth, the number of siblings, the place of birth of the child and of the father and mother.

To discover whether there is any stability in children's expressions of their preferences, individuals of small groups were interviewed, using the subject-matter of the questionnaire. In another group the questionnaire was presented a second time after an interval of six months. The results of these checks determined the foundation upon which the conclusions are based.

- Questions such as, "Which of the three choices is most stable?" "What percentage of secondary school plans persist after six months?" "Are choices of recreations and choices of occupations equally stable?" were answered.
- The results of the intelligence tests have been worked out and shown in curves of distribution for each of the scales in order to compare language with non-language scales; the correlations between these scales have been found. The influence of foreign birth and parentage on the results of the Language Completion Scale is shown by plotting curves of distribution for a group of American born children of American born parents according to the Kelley-Trabue Language Completion Alpha, and the National Intelligence Tests.

The groups planning for High School, for part time secondary education, and for work only, were distributed according to their intelligence quotients. The curves of these show to what extent a child's plans for High School are conditioned by his degree of intelligence.

- Children's expressions of interest as taken from questionnaire data were compared with their composite intelligence ratings. The occupations were divided into the following general groups: skilled trades, mechanics, clerical workers, and professions. This grouping was made necessary by the small numbers in the single occupation. The four groups were then distributed according to intelligence quotients and compared with similar groups taken from the army ratings. This comparison gives

roughly the relation of children's aspirations to life opportunities.

Occupational preferences were also tabulated against life prospects, of which the evidence was the answers to the questions concerning the occupation by which the child expects to make a living. This comparison is discussed under the caption "Correspondence of Aims and Ideals," and yields an interesting result.

The records of a group of children who expressed "mechanical" interests were used to study the significance of success in the Pintner Non-Language Scale.

The results of the entire investigation yield these findings:

The large range of intelligence in any occupation or group of similar occupations proves that interests are more potent than general intelligence in determining the direction of efforts towards particular fields of work. It indicates the need for studying the special drives and capacities during the growing years. Incidental to this is the finding that children's choices during these years are sufficiently stable to be used as guides in directing developmental activities.

The large percentage of children who plan to go to high school lacking sufficient mentality for the required academic work, and also the significant percentage of high grade children who plan for part time secondary education or for work only, indicates the need for scholarships and for more comprehensive vocational training to provide for all degrees of intelligence. The low degree of correspondence between aims and ideals emphasizes this point.

Comparison of the different types of scales indicates that the non-language scale selects children who have a special interest in mechanics. The ratings according to the Kelly-Trabue Language Completion Scale as compared with the ratings of other scales indicate that it is necessary to discount the results of a scale which is highly conditioned by the use of language when given to children of foreign birth or parentage.

A feasible system is given by which any school can keep a record of the child's ambitions and dispositions together with a record of the home background.

Suggestions for further researches are as follows:

1. An investigation of the stability of children's interests in grades below 5b.

2. A study of individual tests composing the non-language scale, to discover which team of tests furnishes the most reliable indication of mechanical interests.

3. A correlation of success in different scales with actual ability in industrial work.

4. An intensive study of a small group, covering a number of years, to determine the relation of interest to actual ability.

Table showing responses to the questionnaire on occupations:\*

	Choices for boys			Choices for girls		
	1st	2nd	3rd	1st	2nd	3rd
Actor. . . . .	35	27	16	89	26	36
Architect. . . . .	3	6	9	4	10	4
Artist. . . . .	18	19	7	45	28	29
Author. . . . .	5	1	3	7	5	8
Automobile mechanic. . . . .	105	49	29	1	1	3
Banker. . . . .	8	15	16	1	2	3
Barber. . . . .	1					
Bell boy. . . . .	2	2	3			
Blacksmith. . . . .	4	2	1			
Book-keeper. . . . .	5	12	4	38	18	26
Bricklayer. . . . .	1	0	1			
Business. . . . .	19	18	9	0	4	7
Butcher. . . . .	5	2	1			2
Car-conductor. . . . .	1	5	3	1	1	
Carpenter. . . . .	18	25	26			
Chauffeur. . . . .	25	46	36	4	3	5
Clerk. . . . .	1	3	6	2	8	4
Cook. . . . .		1	6		6	13
Dentist. . . . .	1	3				
Doctor. . . . .	38	12	15	3	6	3
Draftsman. . . . .	5	6	4			1
Dressmaker. . . . .	1		1	200	63	49
Elevator-man. . . . .	1		3			1
Electrician. . . . .	40	36	28			
Engineer. . . . .	70	40	36			
Engraver. . . . .		1	2			
Errand-boy. . . . .	17	6	17			
Factory-worker. . . . .	2	1	3	8	23	13
Farmer. . . . .	3	9	17		8	
Fireman. . . . .	13	11	10			
Forester. . . . .	6	6	8			
Gardener. . . . .	1	1		2	2	5
Housekeeper. . . . .		2	4	3	8	11
Insurance. . . . .						3

\* The total of these tables vary since some of the children omitted to mark first, second or third choices. Occupations following "worker in laundry" were inserted by the children after they had read the lists.

	Choices for boys			Choices for girls		
	1st	2nd	3rd	1st	2nd	3rd
Janitor. . . . .					2	
Judge. . . . .	2	6	5			
Laborer. . . . .		1	1			
Librarian. . . . .		1	2	3	21	15
Lawyer. . . . .	17	28	13	5	7	11
Mechanic. . . . .	24	62	45			2
Mechanic's helper. . . . .	3	6	4			
Milliner. . . . .			1	13	39	28
Miner. . . . .		2	4		1	
Minister. . . . .						1
Musician. . . . .	14	11	17	12	20	12
Motor-man. . . . .		5	10			
Nurse. . . . .				19	51	43
Office-work. . . . .	14	11	9	6	14	17
Office-helper. . . . .		3	1	1	4	3
Painter. . . . .	1	2	5	0	3	1
Photographer. . . . .	1	1	1		2	5
Plumber's helper. . . . .	1	4	3			
Policeman. . . . .	6	7	10	1	1	
Printer. . . . .	5	5	9	1	1	3
Printer's helper. . . . .	1	3	1	0	1	
Priest. . . . .	6	3	2	1		1
Professor. . . . .	2	3	2			
Salesman. . . . .	3	4	15		3	1
Secretary. . . . .	2	1	9	20	28	28
Shipbuilder. . . . .	1	8	10			
Stenographer. . . . .	2	3	8	65	77	81
Care of home. . . . .		2		16	18	22
Teacher. . . . .	1	1	4	51	57	70
Teamster. . . . .	6	4	9			1
Telegrapher. . . . .	7	1	7			
Telephone operator. . . . .	2	2	4	17	23	33
Typist. . . . .	1	5	10	22	32	39
Waiter. . . . .			1	3	2	3
Worker in laundry. . . . .					2	
Sister. . . . .				1		
Embroidery. . . . .				4		3
Tailor. . . . .	1		2			1
Poet. . . . .				1		
Florist. . . . .					1	1
Designer. . . . .			2	3	3	
Singer. . . . .					1	1
Draper. . . . .					1	
Wrestler. . . . .			1	1	1	3
Missionary. . . . .					1	1
Candy-maker. . . . .				1		
Beader. . . . .				1	1	
Truck driver. . . . .	1					
Ball player. . . . .	1		2			
Detective. . . . .	2	1	3			
Real estate. . . . .	1					

Table showing responses to the questionnaire on occupations (cont.):

	Choices for boys			Choices for girls		
	1st	2nd	3rd	1st	2nd	3rd
Foreman. . . . .	2					
Watchmaker. . . . .	1					
Druggist. . . . .	1			1		
Reporter. . . . .	2					
Jockey. . . . .		1		1		
Accountant. . . . .	1			2		
Delegate. . . . .	1			1		
Longshoreman. . . . .	1					
Furrier. . . . .	2					
Cowpuncher. . . . .	1			1		
Adventurer. . . . .		1				
Sailor. . . . .	4	2		2		
Scientist. . . . .	1			1		
Vice Pres. of U. S. . . . .		1				
Jeweller. . . . .	1					
Aviator. . . . .		2		2		
Pres. of Co. . . . .				1		
Camper. . . . .				1		
Soldier. . . . .	1	2				
Chemist. . . . .	2					
Beef handler. . . . .				1		
Steam fitter. . . . .				1		
Cashier. . . . .				1		
Grocery boy. . . . .	1					
Broker. . . . .	2	1				
Secret service police. . . . .		1				
Poultry raising. . . . .	1					
Pres. of U. S. . . . .				1		
Explorer. . . . .				1		
Wireless operator. . . . .	2			1		
Knitter. . . . .	1					
Office boy. . . . .				1		
Hunter. . . . .		2				
Prize fighter. . . . .				1		
Radio operator. . . . .	1	1				
Athlete. . . . .				1		
Auctioneer. . . . .		1				
Plumber. . . . .				1		
Welder. . . . .	1					
Texas ranger. . . . .		1		1		
Letter carrier. . . . .	1					
Bank messenger. . . . .			1			
Help mother. . . . .	1					
Scientific explorer. . . . .	1					
<hr/>				<hr/>		
Totals. . . . .	614	579	580	677	655	661

### STABILITY OF CHILDREN'S EXPRESSIONS OF THEIR PREFERENCES FOR OCCUPATIONS AND RECREATIONS AND OF THEIR SCHOOL PLANS

Do the child's expressions of his preferences and plans indicate an interest of sufficient persistence to warrant the assumption that we have in them clues to the sources of his spontaneous energy and power? May we count on them as constant forces?

Two methods were adopted to determine the value of the questionnaire as it was used in this investigation.

The first was tried out a month after the questionnaire had been submitted to the girls of Public School No. 3. This was also shortly before the mid-year graduation. Forty girls, comprising the graduating class, were interviewed by Miss Jennings of the Vocational and Employment Service for Juniors.

These interviews were conducted individually and the subjects were aware of the fact that their statements would be used either for placement in industry or placement in secondary school courses leading eventually to professional or industrial careers. Their statements were regularly entered on the cards of the Vocational and Employment Service for Juniors. It was found on comparing the results of these interviews with the questionnaire of the previous month that in only two cases of the forty had there been a new preference expressed. It should be noted that in introducing the questionnaire no special mention was made of plans for vocational guidance but that the natural tendency of a graduating class is probably to adopt a forward-looking attitude. Miss Jennings had not seen the results of the questionnaire before the interviews and her work was therefore free from any suggestion which might have been caused by her knowing the child's previous expression. In the comparison of results, first, second, and third choices were treated as of equal value and only the introduction of a new element was taken into consideration.

In consideration of the fact that these children probably were predisposed toward stability of expression owing to the nearness of an approaching change, and also in order to find out what value, if any, could be placed upon the expressions of the children in the grades below the eighth, the second method was devised. The 6-A class was chosen as a representative group and the questionnaires were re-submitted in May, 1921, after an

interval of six months. No discussion had taken place during this interval and the teachers had not seen the results of the first questionnaire at this time. Thirty-eight children responded to the questionnaire on school plans and recreations, and thirty-six of these to the one on occupations.

In analysing the results it was found that there were four possibilities for each choice of occupations or recreations. First choice, for instance, could remain unchanged or changed to second or third choice or disappear, a new choice being substituted. Choices of allied occupations, as for instance a change from "typewriting" to "office work" were treated as identical choices.

Choices expressed December, 1920, checked May, 1921:

<i>Occupations</i>		<i>Occupations</i>	
First choice	%	Second choice	%
Unchanged. . . . .	16 44.4	Unchanged. . . . .	9 25.
Changed to second..	5 13.9	Changed to first....	4 11.1
Changed to third. . .	3 18.3	Changed to third....	11 30.6
Changed to new.....	12 33.3	Changed to new.....	12 33.33
<hr/>		<hr/>	
Total. . . . .	36 100.0	Total. . . . .	36 100.00

<i>Occupations</i>	
Third choice	%
Unchanged. . . . .	5 13.9
Changed to first....	4 11.1
Changed to second... .	3 8.3
Changed to new.....	24 66.7
<hr/>	
Total. . . . .	36 100.0

	%
Choices showing persistence as unchanged or changed in order only.	60 56
New choices. . . . .	48 44
<hr/>	
Total. . . . .	108 100

<i>Recreations</i>		<i>Recreations</i>	
First choice	%	Second choice	%
Unchanged. . . . .	9 23.7	Unchanged. . . . .	10 26.3
Changed to second..	3 7.9	Changed to first. . .	6 15.8
Changed to third... .	3 7.9	Changed to third. . .	4 10.5
Changed to new....	23 60.5	Changed to new....	18 47.4
<hr/>		<hr/>	
Total. . . . .	38 100.0	Total. . . . .	38 100.0

*Recreations*

Third choice	%	
Unchanged. . . . .	9	23.7
Changed to first....	3	7.9
Changed to second... .	2	5.3
Changed to new.....	24	63.1
 Total. . . . .	38	100.0
 Choices showing persistence as unchanged or changed in order only.		%
New choices. . . . .		57
 Total. . . . .	114	100

*School Plans*

	%
Unchanged. . . . .	22
Become doubtful. . . . .	9
Changed. . . . .	7
 Total. . . . .	38 100

In order to determine the validity of the order of placements of choices or, in other words, to check the relative value of first choice versus second or third, the order of comparison was reversed and the choice of occupations expressed in May, 1921, was checked by the one expressed in December, 1920.

Choices expressed May, 1921, checked December, 1920:

*Occupations*

First choice	%
Unchanged. . . . .	16
Changed from second. . . . .	5
Changed from third. . . . .	4
Changed from new.. . . . .	11
 Total. . . . .	36 100.0

*Occupations*

Second choice	%
Unchanged. . . . .	10
Changed from first... . . . .	4
Changed from third.. . . . .	3
Changed from new... . . . .	19
 Total. . . . .	36 100.0

*Occupations*

Third choice	%
Unchanged. . . . .	4
Changed from first... . . . .	3
Changed from second. . . . .	11
Changed from new.. . . . .	18
 Total . . . . .	36 100.0

Choices unchanged or changed in order only.....	%
New choices. . . . .	44
 Total. . . . .	108 100

<i>Recreations</i>		<i>Recreations</i>	
First choice	%	Second choice	%
Unchanged. . . . .	8 21.0	Unchanged. . . . .	10 26.3
Changed to second. . .	6 15.8	Changed to first. . . .	2 5.3
Changed to third. . . .	4 10.6	Changed to third. . . .	4 10.5
Changed to new. . . . .	20 52.6	Changed to new. . . . .	22 58.0
<hr/>		<hr/>	
Total. . . . .	38	Total. . . . .	38
 <i>Recreations</i>			
Third choice	%		
Unchanged. . . . .	8 21.0		
Changed to first. . . .	3 7.9	39.4	
Changed to second. . . .	4 10.5		
Changed to new. . . . .	23 60.5		
<hr/>			
Total. . . . .	38		
 Choices unchanged or changed in order only.....			
Choices unchanged or changed in order only.....	49	43	%
New choices . . . . .	65	57	
<hr/>			
Total. . . . .	114	100	

Inspection of these results shows a marked difference in persistence of choices of occupations and school plans against choices of recreations; and also in the value of the first and second choice of occupations against third choices. The first choice of occupations shows 66.7 per cent. of persistent choices, the second 66.7 per cent., and the third 33.3 per cent., giving the first and second choices a marked advantage. In checking backwards the first choice shows 69.4 per cent. of persistent choices, the second 47.2 per cent., and the third 50 per cent. The conclusion seems to be justified that the first choice as expressed by the questionnaire used in this investigation is an indication of a persistence of interest sufficient for the needs of a group investigation. In the actual placement of children it would be advisable to leave the arrangements flexible enough for a change at the end of a term. The method could be used advantageously as a first approach to the subject of vocational orientation and the fact that this degree of reliability is found in the first half of the sixth grade, in a spontaneous reaction, without the stimulation of previous discussion or preparation for the response, seems to indicate that at this stage of development, if not earlier, the child mind is in a receptive state for information, discussion, and actual experimentation in the field of vocational enterprise.

This positive finding is emphasized by the contrasting result of the questionnaire on recreational preferences. Here we find 39.5 per cent. of persistent first choices, 52.6 per cent. of persistent second choices and 36.9 per cent. of persistent third choices; and in checking backwards 47.4 per cent. persistent first choices, 42 per cent. of persistent second choices, and 39.4 per cent. of persistent third choices. It was therefore decided that the child's attitude of mind toward recreations is not stable enough to obtain significant expressions by the present method.

The results were foreshadowed by the difference in behavior in the class rooms during the presentation of the two questionnaires. "Occupations" and "School Plans" called forth a serious mood. The prevalent questions were as to the meanings of words: as to whether "what father wants me to do" should figure in the response; whether it was permissible to choose something that was not on the list.

When "Recreations" was presented there was, on the contrary, a prevailing atmosphere of relaxation with occasional outbursts of hilarity and protests against being restricted to only three choices. It is significant, also, that only one child of the group showed no persistent choice in occupations while fourteen showed no persistent choice of recreations. The value of the records lies in individual case study, as a persistent choice of recreations in the face of such general instability would indicate a notable characteristic. Undoubtedly the outline of a personality is incomplete without a knowledge of the favorite recreation.

The following study of the distributions according to the intelligence quotient of children who express interest in the different occupations is founded on the first of their three choices since this choice is on the whole a more reliable measure.

#### CORRESPONDENCE OF AIMS AND IDEALS

The questionnaire sheet concerning the family history and school plans of the children contains these questions: "What do you expect to do for a living at first?" "What do you expect to do for a living later?" Taking the twelve-year-olds as a fair sampling of the entire group, the occupational preferences were tabulated against the life prospects as expressed by the answers to the questions quoted above. The number of

twelve-year-olds who responded to both questions was 311, 151 boys and 160 girls. Each of the three preferences was considered separately in relation to intelligence quotient and to repetition in either of the answers to the questions concerning life prospects. Discrepancies between the answers to the first and second of these questions were recorded as indications of necessary deferment of the fulfillment of an ambition. Answers to the first question which might be considered in any way as stepping-stones to the second were not recorded as discrepancies. Record was also made of the number of cases where the questions concerning life prospects were left doubtful by either a question mark or a vague reply.

There is evidently no relation between the intelligence quotient and any one of the problems as outlined. All the distributions according to I. Q. show a normal curve and central tendency similar to the distribution of the unselected twelve-year-olds. There is, however, a great difference between the correspondence of each of the three preferences with life prospects.

PERCENTAGE OF REPETITIONS

	Boys	Girls	Total
First choice . . . . .	40.4	48.1	45.0
Second choice. . . . .	12.6	19.3	16.0
Third choice. . . . .	6.6	6.9	6.7

PERCENTAGE OF DISCREPANCIES BETWEEN FIRST AND SECOND LIFE PROSPECTS

Boys 6% Girls 17% Total 11.6%

## PERCENTAGES OF VAGUE AND DOUBTFUL LIFE PROSPECTS

Boys 13.2% Girls 21% Total 17%

After due allowance has been made for instability of children's expressions, it still remains clear that a large percentage of children see no connection between the "thing you like best to do" and the occupation which is to take up the bulk of working hours in adult life.

The small percentage of discrepancies between the first and second life prospect, together with the small percentage of vague and doubtful replies shows that children have a definite idea of their life chances or of what they believe to be the limits of their prospects. Since work, in order to be successful, must have a degree of the quality of absorbing play, should not native interest select the life occupation in order that the "stimu-

lus to constant endeavor, the joyous exaltation and the feeling of buoyancy" which are inherent in interest shall function to prevent drudgery in daily work. If records could be kept not only of the school progress of children but also of the mental ratings according to different types of scales of the child's ambitions and tendencies together with a home record to show the probability of his being able to realize his ideals, many disciplinary problems could be forestalled. Not only would mental capacity rather than chronological age determine the rate of learning expected from a student but the type of work making the strongest appeal to his instinctive likes and through which the natural energy is released would be used as a guide in planning educational courses. Qualitative differentiation in the curriculum would then begin wherever maladjustments begin, instead of originating at an arbitrary point known as elementary school graduation. Unit courses in grades above the fourth and perhaps lower, as well as in high schools, might offer such a solution. A few cases are taken from the records of the survey to illustrate this point. These individual records, although taken from the group survey, have been verified so that they are free from any unreliability resulting from group methods.

Case No. 1. M. F. Age 14 yrs. 7 mo. Grade 8-B. Mental age, composite rating 15 yrs. 5 mo. I. Q. 106. Born in the U. S. of Italian parents. Second in order of birth in a family of 8 children. Father, a manufacturer of perfumery; mother, housewife. School attainment, Pintner Educational Scale, is 15 yrs. 2½ mos. Educational Quotient 104. Accomplishment Quotient 98.

This girl's first choice in occupations is to be an artist and her first choice in recreations is visiting picture galleries. Her second choice is the occupation of stenographer. She expects to work as an office girl at first and later to become a "crochet beader." She expects to go to work without further school plans.

It is evident that we have here a discrepancy between aims and ideals; that plans for the future hold no opportunity for developing possible artistic talent or general background in accordance with her mental capacity.

Case No. 2. R. Z. Age 15 yrs. 6 mo. Grade 8-B. Mental age, composite rating 11 yrs. 5 mo. I. Q. 82. Born in Russia. Third in order of birth in family of 6 children; father, harness

business; mother, housekeeper. School attainment, Pintner Educational Scale, 13 yrs. Educational Quotient 87. Accomplishment quotient 106. First choice of occupations, musician; second, secretary. First choice of recreations, dancing; second, embroidery. She is undecided as to what she will do for a living and has no plans for further education but is going to school next year.

This is obviously a case for vocational guidance, for determining the presence or absence of a special talent which may compensate for the lower mental capacity. Her rating on the non-language scale is lower than on the language scales, which indicates that her low rating is not due to foreign birth.

Case No. 3. L. T. Age 12 yrs. 8 mo. Grade 8-B. Mental age, composite rating, 17 yrs. 11 mo. I. Q. 141. The ratings on language and non-language scales are equally high. Born in the U. S. of Italian parents. Father, salesman in a fruit market; mother, housewife. First in order of birth in a family of two children. School attainment, Pintner Educational Scale. 16 yrs. 6 mo. Educational Quotient 130. Accomplishment Quotient 92.

First choice of occupations, stenography; second, taking care of home; third, librarian. First choice of recreations, listening to music; second, drawing; third, writing stories and poetry. She expects to go to commercial high school.

As will be seen in a later chapter, the recreational choices have been discarded as unreliable for generalizations. But they are quoted in this case to show that although the limitations of home environment have probably prevented a high grade mind from realizing its own possibilities the spontaneous enjoyments give testimony of its higher capacity.

This case was reported to the Bureau of "Vocational Guidance for Juniors." The parents have given consent for a change from commercial high school to a classical course and special attention will be paid to her advancement and further plans.

Case No. 4. J. M. Age 15 yrs. 8 mo. Grade 8-B. Mental age, composite rating 10 yrs. 9 mo. I. Q. 72. Born in the U. S. of Italian parents. Third in order of birth in a family of five children. Father, presser; mother, housewife. School attainment, Pintner Educational Scale, 11 yrs. 11 mo. Educational Quotient 79.5. Accomplishment Quotient 110.

First choice of occupations, dressmaking; second, taking care of home. First choice of recreations, auto-driving; second, listening to music.

She expects to go to work and vocational school. The rating on the non-language scale is lower than that of the language scales, which indicates that the low mental rating is not caused by foreign birth.

On investigation it was found that this girl had always been considered as a problem case; too high grade to be classified with mental defectives, too unstable to be allowed to go to work. She had come to the 8th grade through the industrial classes.

The case is cited as one requiring special courses and not having the capacity for the academic work above 5th grade.

The data of these case studies are taken from the regular questionnaire forms and kept in abbreviated form on individual record cards 4x6 in. in size. The method is not prohibitive in either time or space requirements and apart from the giving of the tests the work can be done by clerks.

#### MEASURES OF INTELLIGENCE

For the study of so large a group, individual examinations were prohibitive. It was necessary, therefore, to select from available group scales a team of tests approximating as nearly as possible the results of careful individual examinations. Since the comparisons were to be founded on mental age and intelligence quotient it was further necessary to use the group tests for which age standards had been worked out. In order to avoid unduly disturbing the school routine and creating the atmosphere of excitement and nervous tension so fatal to the validity of mental records, the tests were given in the class rooms and the work of any session did not exceed the time limit of a departmental period; that is, forty minutes, including all the accessory activities such as introduction, and collection of papers.

The mental ratings of the boys of Public School No. 11 were taken from the records of the survey made by Dr. L. S. Hollingworth and her students. This survey consisted of the Pintner Survey Tests generously checked by individual examinations on the Stanford-Binet.

The scales used for the 840 girls of Public School No. 3, Manhattan, and for the group of 200 boys of the 6-A class of Public School No. 95, Manhattan, were Scales A and B, Form 1, of the National Intelligence Tests(17) Pintner Non-Language Scale, and Kelley-Trabue Language Completion Alpha(19). The total time given to the tests of intelligence was approximately two hours.

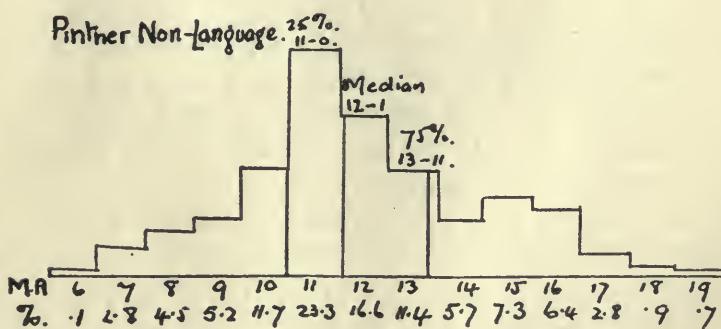
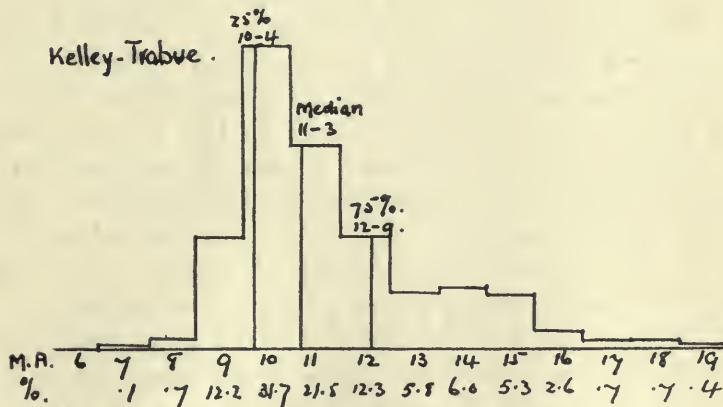
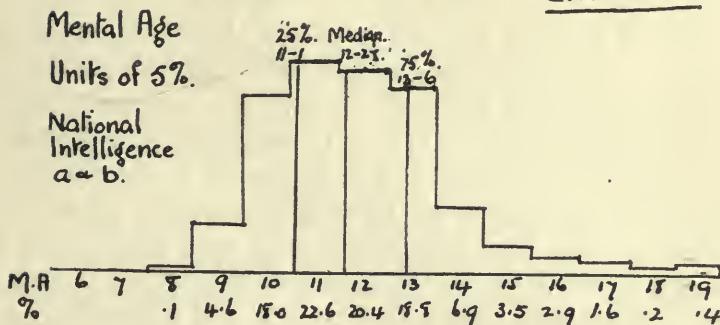
The results were formed into the following composite:

National Intelligence Tests, Form 1, Scales A and B combined . . . . .	weight 4.
Pintner Non-Language Scale . . . . .	weight 2.
Kelley-Trabue Language Completion, Alpha . . . . .	weight 1.

The weights given to each scale were determined by the time required for the test. The lesser weight given to the Language Completion Scale was also due in part to the fact that the school population is largely of Italian birth or descent and that a language test is therefore of lesser value. As will be seen on inspection of the curves of distribution the median mental age of the group was, in fact, according to this scale, one year below the median mental age of the group according to the other scales. In forming the composite this discrepancy was rectified by adding one year to the mental age of each record on this scale.

The norms used in computing the mental age according to the National Intelligence Tests were those found by Terman in the Vallejo Survey(20) for the Pintner Non-Language Scale and the Kelley-Trabue Alpha, the norms published by the authors. Interpolations were worked out by months. For the higher levels beyond the fifteenth year in the National Intelligence Tests, extra-polations were worked out by taking the average increment of the two preceding years as the probable increment of the next year. This increment was then divided by twelve for the increment per month. In the Pintner Non-Language Scale, and Kelley-Trabue, estimations were unnecessary since the norms are worked out for the upper levels.

Chart 1 shows the total distribution according to the three types of scales: National Intelligence Tests A and B, Form 1; Kelley-Trabue Language Completion Alpha, and the Pintner

Total Distribution. CHART I.

Non-Language Scale. The total number of cases for each of these was respectively: 824, 857, and 878. The frequencies are given in percentages in order to equalize the surfaces of distribution. Units of 5 per cent. are represented by each square of one-fourth inch. For purposes of comparison the base-lines

showing the mental ages are placed so that the mental ages of the three coincide.

As may be seen by inspection of the charts, the distribution according to the National Intelligence and Pintner Non-Language Scales show a marked similarity. The median mental age, the 25 percentile and the 75 percentile differ by less than half a year. At the lower end of the curve of the National Intelligence Tests there is an abrupt stop at the ninth year of mental age. Only one child of 824 who took these tests had a mental age below 9 years. In consideration of the fact that the survey covered only grades 5-B to 8-B and that the ungraded classes were not included, we may infer that the National Intelligence Tests in this combined form are an efficient measure for identifying the amount of retardation at present used for placement in ungraded classes from these grades. The curve of the Pintner Non-Language Scale, on the contrary, extends downward to 6 years mental age. At the upper end of the curve the discrepancies between the three scales are slight. Children of high I. Q., that is, above 110 according to the National Intelligence Tests, evidently overcome their language handicaps sufficiently to rate equally as a group on the two scales.

The inter-relations of the findings of the three scales is made clearer by their correlations. Equal distribution does not indicate equal meaning. A group of people may be equally distributed on a scale of honesty, and on another for physical beauty, and have a zero correlation in the two traits. A normal curve merely indicates that the measure is valid and the group probably unselected. It is the correlation which designates the comparative agreement in the traits which are the factors making for success in the tests used.

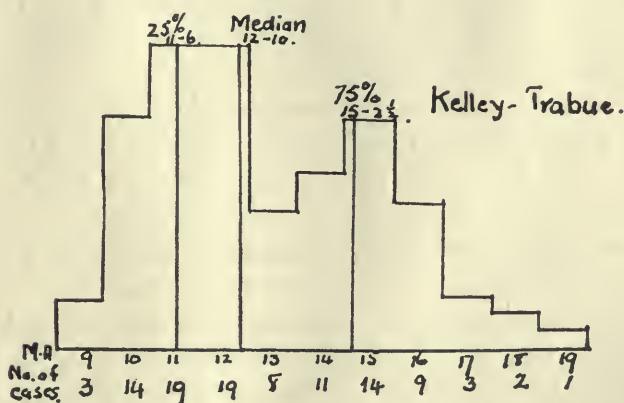
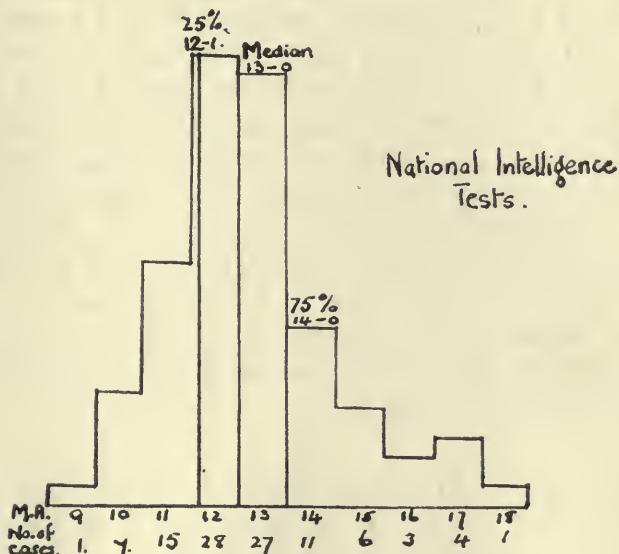
Correlations have been worked out between the Pintner Non-Language Scale and the National Intelligence Tests with the following results. The Pearson Product Moment ( $r = \frac{XV}{N \sum xy}$ ) was the method used in all the correlations found in this investigation.

620 girls Chronological Age 10 — 16 Grade 5B — 8B  $r$  51 P. E. = .02  
188 boys Chronological Age 10 — 15 Grade 6A —  $r$  31 P. E. = .04  
106 girls Chronological Age 10 — 16 Grade 6A —  $r$  25 P. E. = .06

Effort was made to determine the effect of foreign birth on the results of the language completion scale. It was found that

CHART. 2.

American Born Children of American Born Parents.  
103 cases. Units of 3.



of those who had been tested by both scales there were 103 who were American born children of American born parents. The records of these children were distributed according to the I. Q. on the National Intelligence Tests A and B combined, and also

on the Kelley-Trabue Completion Alpha. The results are shown on Chart 2. The mental ages, represented by the base lines are drawn parallel. The frequencies are represented in units of 3 to each square of one-fourth inch. Comparison of these distributions with those of Chart 1 emphasizes their significance. It will be seen that although the median mental age of the entire group as shown on Chart 1 is 11 years 3 months, according to the Language Completion Scale in contrast to 12 years 1 month on the Non-Language Scale, and 12 years 2½ months on the National Intelligence Scale, the group of American born children of American born parents has a median mental age of 12 years 10 months on the Language Completion Scale, in agreement with 13 years 0 months on the National Intelligence Tests. The greater variability found in the distribution according to the scores in Language Completion Scale, made by children who represent the second generation in America may be due to the continued use of the Italian Language in some of the homes.

#### THE PINTNER NON-LANGUAGE SCALE AS A TEST OF INTEREST IN MECHANICS

The low correlation of the Pintner Non-Language Scale, where the language factor has been eliminated, with the combined National Intelligence Tests leads to the question of what traits are measured by the former.

Is there any homogeneous group which shows a marked difference in distribution on the two scales? Are there any mental activities called into play by the non-language scale which do not function so largely in tests in which language is the medium for response? Conceding that the mind works as a whole in each mental act, is there not a difference between the mind set required for response to arithmetical reasoning and naming opposites and that required in form-naming tests, or learning by substitution of symbols, following directions given, using dots and showing steps in movement with a pointer, and completing similar drawings in inverted positions? Even in tests of associative power such as sentence completion and picture completion, is there not more of eye hand co-ordination and visualization required in the latter and more abstraction in the former? Equally, in occupations such as for example drafts-

man, civil engineer, architect, do not the same powers of visualization and eye hand co-ordination make for success, in contrast to the needs of lawyers or bookkeepers, and others? Is it not in accordance with known facts concerning individual differences to suppose that some thought circuits include the ocular nerves and the nerves of the hand while others find greater readiness in the cerebral areas? The end product may be of equal value but the type of output will be essentially different.

The questionnaire method used in this investigation offers a group of 104 children who expressed a preference for occupations in which manual ability and visualization are assumed to be prerequisite. This choice was expressed as a first or second choice, third choice being discarded as too unreliable for the purpose of indicating a definite trend. The group was composed as follows:

Preference in occupation	No. of cases
Civil Engineer. . . . .	2
Electrician. . . . .	8
Auto Mechanic. . . . .	38
Engineer. . . . .	5
Mechanic. . . . .	18
Carpenter. . . . .	9
Blacksmith. . . . .	1
Embroiderer. . . . .	4
Shipbuilder. . . . .	1
Gardener. . . . .	4
Architect. . . . .	11
Printer. . . . .	3
<hr/>	
Total. . . . .	104

The chronological age of the group shows a distribution from 10 years 2 months to 15 years 9 months, the median being 12 years 5 months, the 25 percentile, 11 years 9 months, 75 percentile, 13 years 6 months. The group is therefore not selected for chronological age since the median chronological age of the entire group is 12 years 11 months, 25 percentile 12 years 1 month, and 75 percentile 13 years 11 months.

Graphs A. and B. of chart 3 show the distributions of this group according to I. Q., on the National Intelligence Tests and the Pintner Non-Language Scale. The medians, 25 percentiles, 75 percentiles, and semi-interquartile range, are:

	National Intelligence Test I. Q.	Pintner Non-Language Scale I. Q.
25 percentile. . . . .	83	91
Median. . . . .	91	99
75 percentile. . . . .	97	113.5
Q. . . . .	7.2	11.07
Range. . . . .	65 to 119 (one out- standing 140)	55 to 150

The children who express interest in mechanical occupations make higher scores on the Pintner Non-Language Scale. The median mental age according to this scale is higher than the 75 percentile of the same group according to the National Intelligence Tests, and the percentile according to the former is equal the median according to the latter.

In order to investigate still further, a selection was made from this group of 104 children, of those who both in first and second choices expressed interest in the occupations listed above. This second group consisted of 32 children. The differences shown by the preceding group are here accentuated. The 25 percentile according to the Pintner Non-Language Scale is slightly higher than the 75 percentile according to the National Intelligence Tests. These distributions are shown by graphs c and d of chart 3.

	National Intelligence Test I. Q.	Pintner Non-Language Scale I. Q.
25 percentile. . . . .	84.7	94.9
Median. . . . .	88.7	104.5
75 Percentile. . . . .	94	124.6
Q. . . . .	4.7	14.84
Range. . . . .	65 to 109	80 to 149

As a check upon these results, a third group was selected, consisting of those whose choices in occupations, recreations or life plans, contained no indication of interest along mechanical lines. This group numbered 185. The distributions are shown in graphs e and f, chart 4. Here we find that the median I. Q. according to the National Intelligence Tests is about 7 points higher than the median I. Q. according to the Pintner Non-Language Scale. The 25 percentile of the National Intelligence Tests is about 8 points higher than that of the Pintner Non-Language Scale. The 75 percentile of the National Intelligence

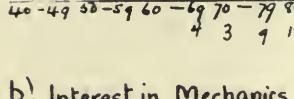
Interest in Mechanics.

Units of 2.

1<sup>st</sup> or 2<sup>nd</sup> choice.

a.) Total 104.

$$Q = 7.2.$$

CHART.3.

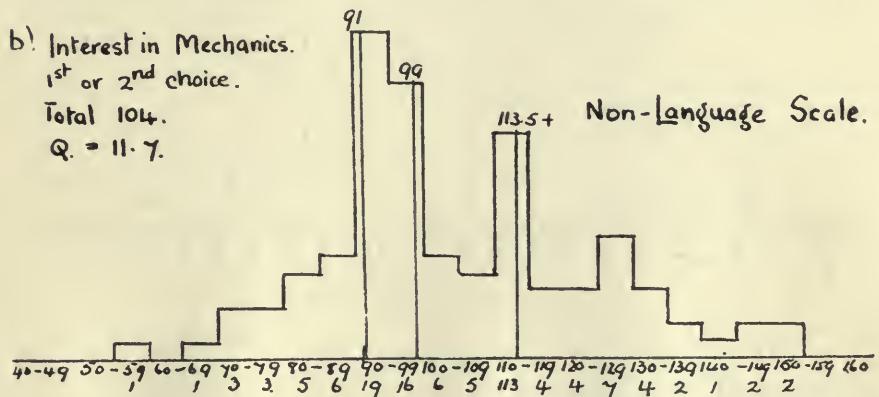
National Intelligence Tests

b.) Interest in Mechanics.

1<sup>st</sup> or 2<sup>nd</sup> choice.

Total 104.

$$Q = 11.7.$$



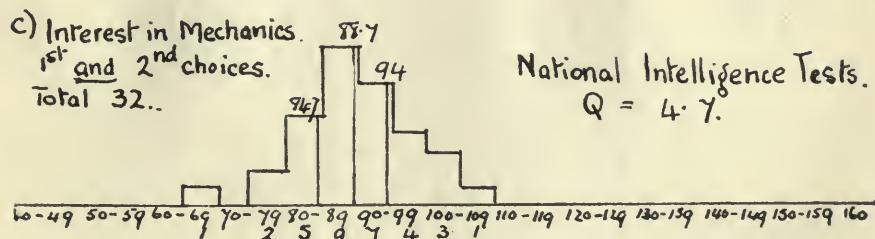
c.) Interest in Mechanics.

1<sup>st</sup> and 2<sup>nd</sup> choices.

Total 32..

National Intelligence Tests.

$$Q = 4.7.$$



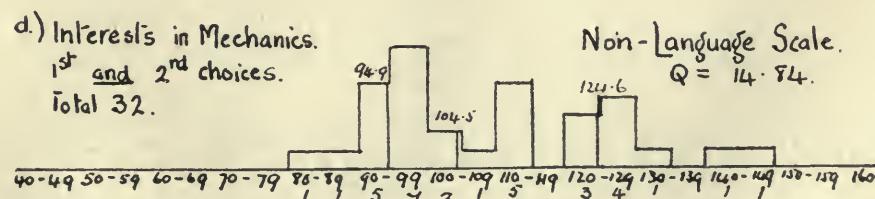
d.) Interests in Mechanics.

1<sup>st</sup> and 2<sup>nd</sup> choices.

Total 32..

Non-Language Scale.

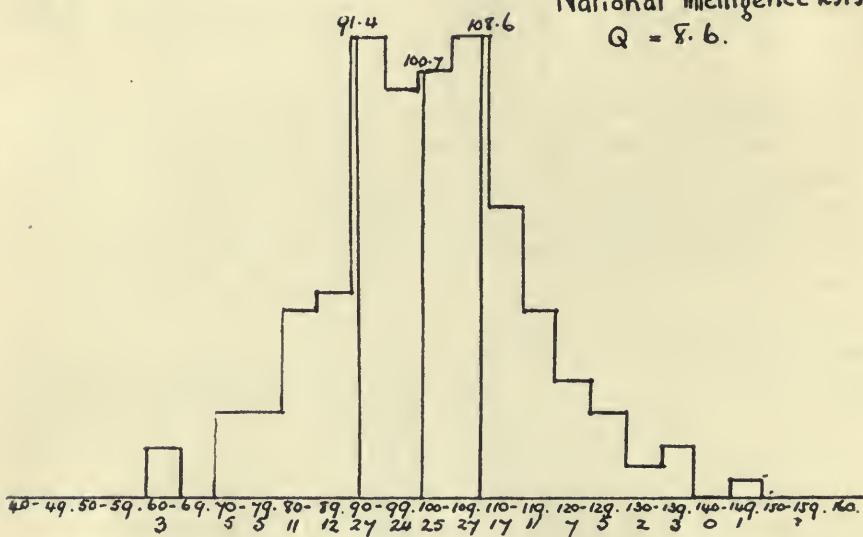
$$Q = 14.84.$$



No Interest in Mechanics.  
e) Total 185.

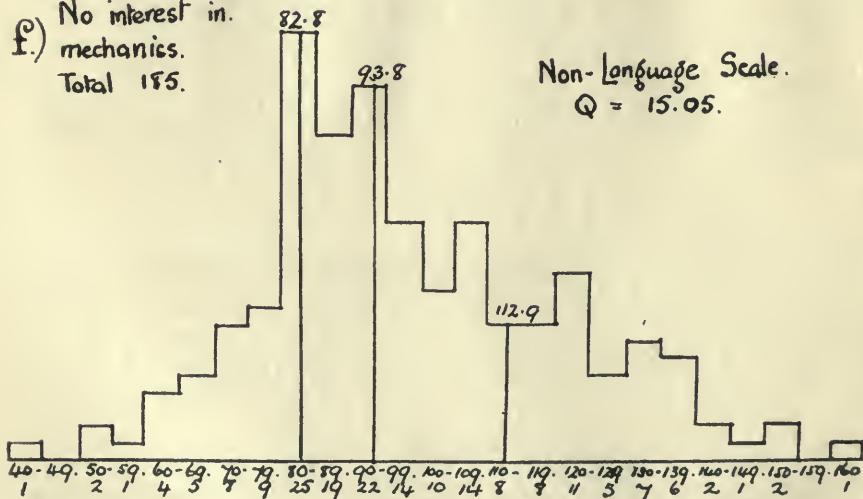
CHART. 4.

National Intelligence Tests.  
 $Q = 8.6$ .



f) No interest in mechanics.  
Total 185.

Non-Language Scale.  
 $Q = 15.05$ .



Tests is, on the contrary, 4 points lower than that of the Pintner Non-Language Scale.

	National Intelligence	Pintner Non-Language
	Test I. Q.	Scale I. Q.
25 percentile. . . . .	91.4	82.8
Median. . . . .	100.4	93.8
75 percentile. . . . .	108.6	112.9
Q. . . . .	8.6	15.05
Range. . . . .	60 to 149	10 to 160

It is significant that the groups shown on chart 3, c and d, are composed entirely of boys and that groups a and b, total 104, contain only 12 girls. On the contrary groups e and f, chart 4, contain only 11 boys. Separate distributions for boys and for girls regardless of occupational preferences were therefore necessary. They show the following differences:

#### NATIONAL INTELLIGENCE TESTS

	Boys	Girls	Total
	I. Q.	I. Q.	I. Q.
25 percentile. . . . .	81.7	87.4	85.8
Median. . . . .	90.1	97.0	95.3
75 percentile. . . . .	98.0	107.2	105.5
Q. . . . .	8.15	9.9	9.85
Range. . . . .	60 to 125	60 to 150	60 to 150

#### NON-LANGUAGE SCALE

	Boys	Girls	Total
	I. Q.	I. Q.	I. Q.
25 percentile. . . . .	93.0	81.1	83.2
Median. . . . .	101.5	91.6	94.0
75 percentile. . . . .	117.8	105.7	108.8
Q. . . . .	12.4	12.3	12.8
Range. . . . .	65 to 160	40 to 160	40 to 160

Since the boys in the preceding tables are taken from class 6A only, and the girls from grades 5B to 8B, the distributions of 6A girls are given separately:

Girls 6A	National Intelligence	Pintner Non-Language
	Test I. Q.	Scale I. Q.
25 percentile. . . . .	82.5	66.5
Median. . . . .	94.6	84.6
75 percentile. . . . .	103.25	96.4
Q. . . . .	10.37	14.95
Range. . . . .	60 to 130	45 to 145

Of this group of 108 girls, only three expressed preferences for mechanical occupations as here defined.

In comparing these distributions we find that the children

expressing mechanical preferences have approximately the same median and variability as all boys, and that the children showing no mechanical preferences agree in median and variability with all girls. On the other hand, all boys with the exception of the 11 quoted above showed a mechanical preference in some one part of their records.

The differences between the distributions of boys and girls may be stated quantitatively: 31 per cent of girls equal or exceed the median of boys on the Non-Language Scale, while 71 per cent of girls equal or exceed the median of boys on the National Intelligence Tests. As may be seen by reference to the respective tables given above, in the total distribution of boys and girls the medians according to the two scales are only one point apart, although the variability is greater according the Non-Language Scale. The composite of these scales forms a test of intelligence in which no sex difference is shown. Studies of sex differences reported by Thorndike(34) would lead us to expect this result of a well-balanced scale of general intelligence.

We may conclude, in view of these findings, that there is, on the whole, a high degree of correspondence between interest in mechanics as here defined and success by the Pintner Non-Language Scale; and that this interest in mechanics and this correspondence involve the activities preferred by boys. We cannot, from the present data, discriminate between sex difference and difference of interests.

All groups show a greater variability according to the Non-Language Scale than according to the National Intelligence Tests when distributed according to I. Q. These variabilities compare with that of the I. Q. according to Stanford-Binet (32, page 40) as follows:

	Q.	Range
Stanford-Binet. . . . .	8.65	56-145
National Intelligence Tests. . . . .	9.85	60-150
Non-Language Scale. . . . .	12.8	40-160

#### Variability according to mental age:

Stanford-Binet (14 yr. group).....	13 mos.
National Intelligence Tests.....	14.5 mos.
Non-Language Scale. . . . .	17.5 mos.

A greater variability might be expected in a test of special ability than a test of general intelligence. A close study of

successes in each of the tests composing the Non-Language Scale in relation to other tests of the same scale and in relation to sex differences will be necessary to assure a definite value in outlining occupational prospects.

An investigation by Miss Thyra Smith into the relation of the different scales to success in industrial training is now in progress in the psychological laboratory of Children's Hospital, Randall's Island. If interest and capacity are as nearly allied in industrial as in educational work, we must expect corroboration of the present results. Since we have no measure of the degree of interest in the data here presented, we are unable to find the correlation of single tests of the Non-Language Scale to interest in mechanics. This disability will not be present in the research above-named since a rating scale will form the basis of comparison.

#### VOCATIONAL INTERESTS AND SCHOOL PLANS IN RELATION TO INTELLIGENCE QUOTIENTS

A low mental capacity does not deter children from entering high schools. Studies of elimination show that only a small percentage of entrants remain to graduate, but evidently the striving for improvement, the interest in self-advancement, the forward looking element in human nature is strong enough to carry children of actual dull normal and border-line capacity through the upper grades of the elementary school for which they have only a limited capacity and for the work of which they needs must use a maximum effort for a minimum attainment. Furthermore these interests keep them striving onward through the ninth and tenth grades seeing only "as through a glass darkly" the implications of what is going on about them; losing self-respect through repeated failures; acquiring wrong conceptions of the relations of effort to attainment; forming pernicious life habits in adolescent years.

The findings here presented have been substantiated by the results of tests given to high school freshmen. Nine hundred and forty-nine entrants of the Washington Irving High School, New York City, January 28, 1921, were given as group test Haggerty Delta II. The distribution was shown to range from I. Q. 70 to 135 with a median I. Q. of 103.8. Similarly, in 1918, Wm. M. Proctor (29) and collaborators examined 107 high

school freshmen of Palo Alto, California. The Stanford-Binet scale was used and these individual examinations yielded results in conformity with the New York findings. The median of the group was found to be I. Q. 105.9, the 25 percentile I. Q. 94.7, and the 75 percentile was 117.

These findings are in agreement with those of the present investigation. Children planning to go to high school have approximately the same distribution as those who actually enter.

The number of children who responded to the questionnaire concerning school plans was 1,206. Four hundred and eight or 33.8 per cent planned to go to high school, 577 or 47.8 per cent planned to go to work with part time secondary education, 221 or 18.3 per cent planned to go to work only. The percentage planning to go to high school corresponds roughly to the percentage reported as entering high schools by Strayer in his report of 318 cities.(21) Comparing the percentages of girls and boys respectively we have the following:

	High School		Part Time		Work	
	No. of Cases	%	No. of Cases	%	No. of Cases	%
Boys . . . . .	148	27	306	55.8	94	17.1
Girls . . . . .	260	39.5	271	41	127	19.2

Although approximately the same percentage of either sex is planning for secondary education in one form or another, the number of boys who are forced to do part time work exceeds that of girls by nearly 15 per cent. It should be noted that the social status prevailing in the three schools included in this survey are about equal.

The distributions and central tendencies of the three groups are shown in the following graphs.

The validity of mental ratings founded on the National Intelligence Tests is assumed in the present discussion. The correlation with Stanford-Binet as worked out by the authors is .93(21); and the validity of classifications according to the Stanford-Binet has been established by Terman and his co-workers.(22)

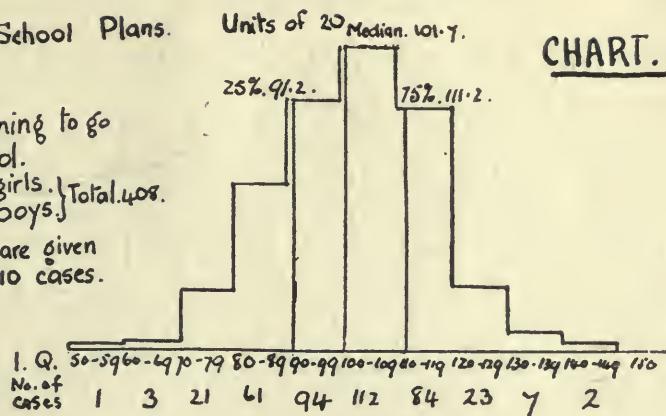
The percentages quoted in the deductions and conclusions leave a wide margin for the discussion of the exact I. Q. required for high school work. The discussion is not within the scope of

CHART. 5.

c. Children planning to go to High School.  
 260 cases, girls. } Total 408.  
 148 cases, boys. }

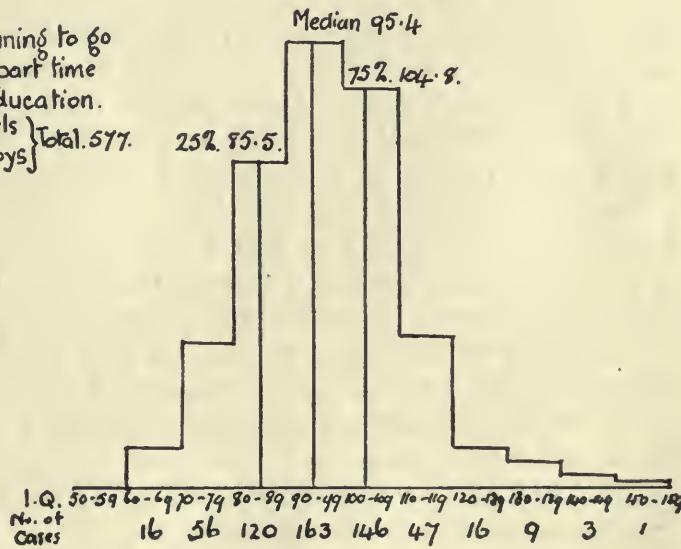
Frequencies are given in units of 10 cases.

$Q = 5$



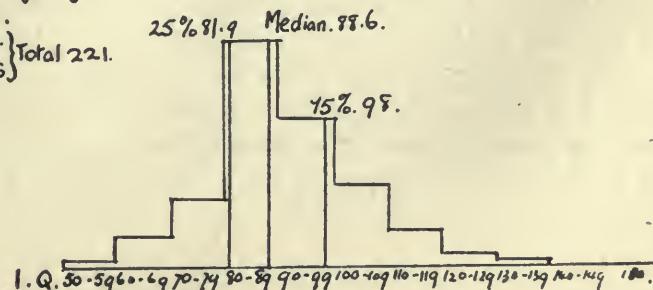
6. Children planning to go to work with part time secondary education.  
 271 cases, girls } Total 577.  
 306 cases, boys }

$Q = 9.6 +$



c. Children planning to go to work only.  
 127 cases, girls. } Total 221.  
 94 cases, boys. }

$Q = 8 +$



this study, but the data might furnish a basis for a follow-up study of the children involved.

It will be seen that the high school does select somewhat from the upper end of the curve of distribution. But it is the overlapping of the three curves which is significant. In the present organization of the academic high school approximately 50 per cent of the children who enter high school are attempting a hopeless task. Twenty-five per cent of the part time students, and 15 per cent of those going to work have the mental capacity for high school graduation. And since, as we have seen, the expressions of 6th grade children by the questionnaire method are sufficiently stable for drawing general conclusions, plans could be made in the elementary school to avoid waste of public money and of human energy. Given the learning curve and upper mental limits of each child by means of mental tests; given also his spontaneous expression of interest; courses could be provided in which the motive forces of the child could be used to assure his fullest development. Unit courses such as are proving successful in dealing with the high school problem would go far to save both teacher and class from futile efforts.

Future research will no doubt enable us to evaluate the child's desire by means of tests of actual capacity for different types of work. But even with such information on hand we must expect to find a curve of distribution according to general intelligence within each group. Two boys may express equal enthusiasm for learning a trade. The one with lower intelligence may find his upper limit of development in a type of work usually done by apprentices; the other, of high mentality, may pass quickly through the lower stages of the work to the status of an expert. But both will be functioning according to best advantage, each gaining the natural satisfaction due to the working out of the inner drives of his organism. Again, ordinary life experience teaches us that there is a differentiation of interest within each trade, profession, or art. Of two musicians, one will get a better response from a stringed instrument, while to another inspiration comes through the touch of ivory keys.

The distribution according to intelligence of men actually placed in different occupations is given in the report of the Division of Psychology of the Office of the Surgeon General of the U. S. Army.(23) Although the medians of the different groups

rise gradually from the group whose middle 50 per cent is of common laborer in C rating to that of engineer officer in A rating, the rise is by almost imperceptible degrees and the overlapping is significant. General electricians, for instance, ranged from 1.6% rated D (up to I. Q. 63) to 9.8% rated A (I. Q. 120 or over); stationary gas enginemen from 2.7% rated D to 2% rated A.

Thorndike comments on the variability of I. Q. within the occupational groups of the army:(33) "No less significant is the variability within each occupational group. Taking the measurements as they stand, the 75 percentile unskilled laborer is up to the level of the median general mechanic, tool room expert, or automobile mechanic and up to the level of the 25 percentile mechanical engineer. The 75 percentile railroad clerk is at the level of the average accountant or civil engineer. The 75 percentile receiving or shipping clerk is at the level of the 25 percentile physician. This variability would be reduced by longer and repeated tests, but, unless the test as given has a very large probable error, it would still be enormous. It would still imply that there were in the occupations supposed to give little opportunity for the use of intellect, a very large number of gifted men and consequently a large unused surplus of intellect."

These occupations were represented by numbers of men for sufficient reliable curves. But in studying the expressed interests of children in occupations it was found that the number of cases in each specific occupation was too small for statistical accuracy. It was necessary for purposes of comparison to make general classifications. The occupations were therefore divided into four groups: skilled trades, mechanics, clerical work, and professions.

These groups were composed as follows:

Skilled Trades	No. of Cases
Dressmaker. . . . .	193
Painter. . . . .	1
Candymaker. . . . .	1
Gardener. . . . .	3
Printer. . . . .	7
Car conductor. . . . .	2
Policeman. . . . .	8
Factory worker. . . . .	8
Barber. . . . .	1

## INTERESTS IN RELATION TO INTELLIGENCE

Skilled Trades	No. of Cases
Shipbuilder.	1
Foreman.	2
Plumber.	1
Embroiderer.	4
Bricklayer.	1
Milliner.	13
Waiter.	3
Butcher.	5
Teamster.	6
Blacksmith.	3
Fireman.	11
Carpenter.	18
Housekeeper.	3
Welder.	1
Soldier.	2
Sailor.	3
Camera man.	1
Watchmaker.	1
Jeweler.	1
Ball player.	1
Forester.	6
Farmer.	4
 Total.	 315
Mechanics	No. of Cases
Chauffeur.	27
Electrician.	49
Auto mechanic.	92
Truck-driver.	1
Engineer.	41
Mechanic.	23
 Total.	 232
Office Work	No. of Cases
Telephone operator.	19
Draftsman.	5
Office work.	21
Telegrapher.	5
Typist.	26
Stenographer.	67
Secretary.	20
Book-keeper.	41
 Total.	 204
Professions	No. of Cases
Artist.	68
Poet.	1
Nurse.	21
Chemist.	2
Detective.	2
Scientific explorer.	1

Professions	No. of Cases
Druggist. . . . .	2
Judge. . . . .	3
Missionary. . . . .	8
Doctor. . . . .	40
Author. . . . .	10
Librarian. . . . .	7
Ship's officer. . . . .	1
Radio operator. . . . .	1
Architect. . . . .	6
Wireless expert. . . . .	2
Lawyer. . . . .	27
Dentist. . . . .	1
Reporter. . . . .	2
Banker. . . . .	8
Teacher. . . . .	52
Musician. . . . .	26
Civil engineer. . . . .	9
 Total. . . . .	 300

It was found that 122 children had marked "actor" as first occupational preference. As this was the first word on the list it was suspected that the directions had been misunderstood or that these children had followed the path of least resistance in marking. This would constitute one factor of unreliability in the present method. This group had a range from I. Q. 58 to 130. The median I. Q. was 96.9, the 25 percentile I. Q. 87, and the 75 percentile I. Q. 109, and the curve shows a marked irregularity. Whatever influenced the choice was not, therefore, necessarily inferior mentality.

Twenty children chose common labor, such as errand boy, elevator man and longshoreman. These ranged from I. Q. 70 to 120. There were 29 prospective business men ranging from I. Q. 60 to 130, choosing "real estate," "clerk," "broker" and "salesman." Seventeen girls ranging from I. Q. 70 to 120 gave "care of home" as first choices. The number of these groups is too small for statistical treatment.

Charts 6 and 7 show the distributions according to intelligence quotient of the children expressing interest in skilled trades, in mechanics, and in clerical work compared to similar groups taken from the army records.(23)

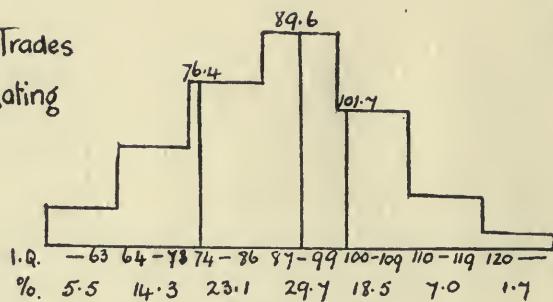
The probable errors of the medians of these distributions

5 Q

(4 $\sqrt{N}$ ) are as follows:

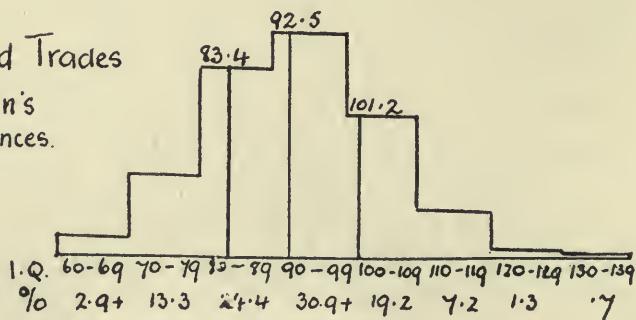
Skilled Trades

Army Rating

CHART. 6.

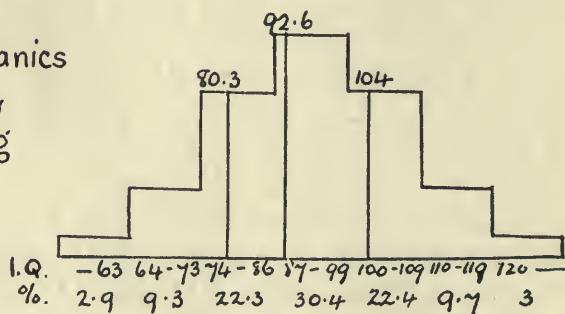
Skilled Trades

Children's Preferences.



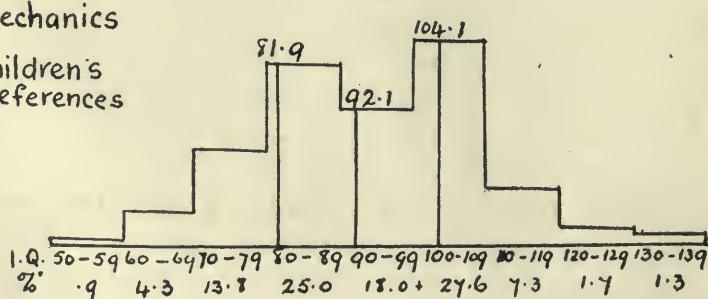
Mechanics

Army Rating



Mechanics

Children's Preferences



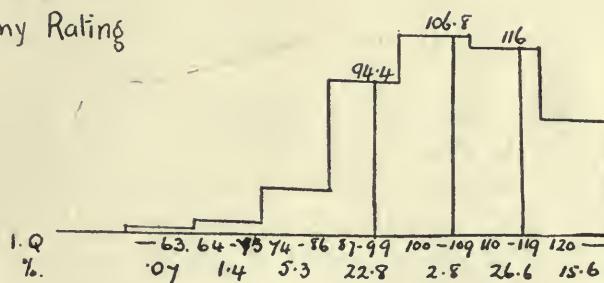
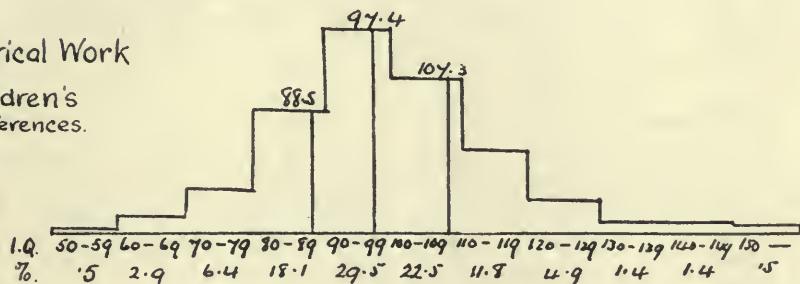
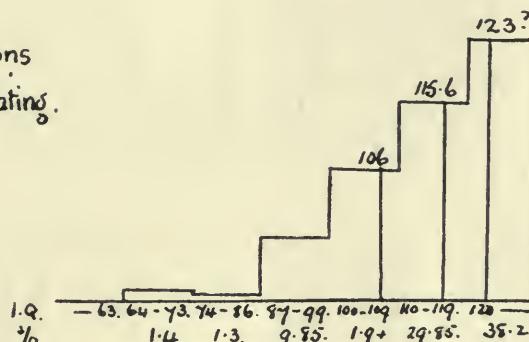
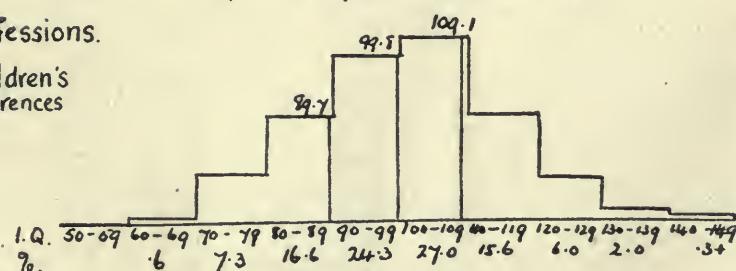
Clerical Work  
Army Rating

CHART 7.

Clerical Work  
Children's Preferences.Professions  
Army Rating.Professions.  
Children's Preferences

	Q.	P. E. of median
Skilled trades. . . . .	8.9	.63
Mechanics. . . . .	11.1	.78
Clerical work. . . . .	9.4	.82
Professions. . . . .	9.7	.67

In order to obtain data for the distribution from the army ratings, the percentile distributions of the groups composing, respectively, skilled trades, mechanics, and clerical workers were taken from Table 378, "Intelligence and Occupation" (p. 828), and summarized. The letter ratings of Alpha and Beta combined were converted into intelligence quotients according to the accepted army standard (p. 423). The groups were composed as follows:

#### Skilled Trades

Occupation	I. Q.	63	64-73	74-86	87-99	100-109	110-119	120 or over
General blacksmith. . .	5.4	13.9	20.5	31.3	18.8	8.2	1.7	
General carpenter. . . .	3.3	10.5	24.1	31.9	20.7	7.6	1.9	
Painter. . . . .	4.8	12.2	22.5	33.	18.2	7.7	1.5	
Plumber. . . . .	2.6	9.6	20.4	31.9	23.7	9.2	2.6	
Locomotive fireman. . .	3.0	9.0	21.5	36.4	21.1	7.1	1.9	
Teamster. . . . .	9.4	19.7	24.9	27.9	12.5	4.3	1.3	
Butcher. . . . .	3.1	11.3	22.8	31.8	21.6	8.3	1.1	
Barber. . . . .	6.6	18.8	26.5	26.3	14.9	6.1	.8	
Horseshoer. . . . .	7.1	17.5	25.0	29.7	15.1	5.2	.5	
Gen. pipe fitter. . . . .	2.8	7.8	23.4	29.8	26.1	7.8	2.3	
Bricklayer. . . . .	9.7	16.4	21.3	25.6	15.9	8.2	2.9	
Tailor. . . . .	8.4	25.5	24.7	20.9	14.2	4.6	1.7	

#### Mechanics

Gen. machinist. . . . .	4.1	10.8	22.7	29.2	21.2	9.3	3.0
Gen. electrician. . . . .	1.6	3.8	10.4	28.4	27.7	18.2	9.8
Auto chauffeur. . . . .	2.3	8.5	21.0	31.3	22.5	10.2	4.1
Gen. auto repairman. . .	1.9	6.7	21.2	31.7	25.1	10.6	2.8
Stationary gas engine- man. . . . .	2.7	10.2	30.7	30.0	15.7	8.5	2.0
Tel. and telegraphic lineman. . . . .	2.9	8.0	21.7	33.9	20.8	8.9	3.8
Auto engine mechanic. . .	1.2	2.9	20.7	35.1	24.7	11.5	4.0
Gen. boilermaker. . . . .	5.9	14.4	29.4	29.4	11.8	7.2	2.0
Gen. mechanic. . . . .	4.3	11.6	16.7	28.3	24.6	14.5	
Railroad shop me- chanic. . . . .	5.4	16.2	27.1	21.6	18.9	8.1	2.7
Tool room expert. . . . .		6.8	20.5	34.1	29.5	6.8	2.3
Locomotive engineman	1.8	12.7	21.8	32.7	27.3	3.6	
Marine engineman. . . . .	4.3	8.5	25.6	29.8	21.3	8.5	2.1

## Clerical Work

Telegrapher. . . . .	1.2	10.0	29.1	32.2	20.3	7.3
Bookkeeper. . . . .	.2	.9	4.4	17.9	29.9	28.6
Gen. clerk. . . . .	.3	.9	5.2	19.7	33.6	25.0
Stenographer & typist. .			1.7	8.7	27.1	34.3
Telephone operator. .	1.8	7.3	47.3	23.6	20.	
Filing clerk. . . . .	3.6		23.6	32.7	23.6	16.4
Mechanical draftsman. .	1.7	8.6	13.8	17.2	34.5	24.1

## Professions

Engineer officer. . . . .		.4	3.6	16.3	79.6
Medical officer. . . . .		.88	3.1	18.6	36.8
Dental officer. . . . .			19.0	26.6	36.7
Army chaplain. . . . .			1.5	8.4	24.5
Army nurse. . . . .	.2	3.1	17.7	34.4	26.9
Civil engineer. . . . .	1.9	1.9	9.4	18.9	34.0
Mechanical engineer. .	8.9	4.4	22.2	17.8	24.4
Accountant. . . . .		.5	5.5	26.2	39.1
					28.7

In February, 1921, vocational interests were made the subject of interview in Public School No. 11, New York City, by Dr. Ruth Clark of the Vocational Guidance and Employment Service for Juniors.(28) The interval since the giving of the group questionnaire was nearly a year so that Dr. Clark's results may be used as a legitimate check on the first. They furnish adequate corroboration. Grades 5 to 8 were covered including the opportunity classes, and the intelligence quotients are the same as those used as a basis for the present study. The findings of this investigation are shown in the following table:

Vocations	No.	Range of I. Q.	Av. I. Q.
Skilled mechanics. . . . .	143	53-136	90.4
Professions. . . . .	77	46-146	100.8
Office work. . . . .	35	65-136	92.4
Business. . . . .	20	64-142	98.2
Unskilled labor. . . . .	14	64-110	81.1
Artistic work. . . . .	12	67-107	85.5
Semi-professional. . . . .	9	71-120	95.1
Physical prowess. . . . .	6	72-109	86.6
Machine operator. . . . .	4	64-92	77.7

For the group of children planning for professional careers, we have no parallel group of adults either in the army ratings or in the reports of psychological experimentation. Although the curve has been drawn showing the distribution of such professionals as were functioning in their own occupation in the army, it is recognized that they are not a representative group.

Comparison of the lists will show that the children's choices covered 24 professions, while only 8 were represented in regular work of the army. It is significant, however, that although the median of the army professional group is well within the classification of superior adult, the lower 25 per cent extends from average to border-line and below. Our professional standards have evidently been low when individuals of inferior types have found it possible to obtain certification. And, although the minimum requirements in terms of general intelligence have not been determined for the professions listed in the children's choices, it is a safe assumption that nearly 50 per cent must fail of their ambition, since a college degree or at least a high school diploma is a prerequisite for training. If effort could be made to discover what particular element in the profession is the determining factor of their choices, this element might be found in an occupation within the scope of their mental capacities. Job analysis is still in its infancy, but surely its proper sphere begins where children's native drives for future life begin to be directed into definite grooves.

The distribution of clerical workers in the army shows a median I. Q. of 106+ in contrast to the median I. Q. of 97+ found among the children of similar group. It may be that individuals were impressed for the clerical work of the army, who in peace time were occupied with professional work for which there was no call in the army. Of the children expressing interest in clerical work, the upper 25 per cent would probably rise to higher positions using office work as a stepping stone.

The groups of mechanics and of skilled trades agree in essential points when army ratings and children's choices are compared. If the army ratings of these groups may be taken as representing life opportunity and the children's preferences as life aspirations, we may infer that there is no real discrepancy between the two, but that there is a place for each one according to his capacity to fill it. It is also obvious that the lower 50 per cent of these groups comprising nearly 25 per cent of the entire group included in this investigation would have a better preparation for adult life if their mental limitations were taken into account in the elementary school and special courses were provided which gave them opportunity for capitalizing their

mechanical abilities. Cultural subjects need not, thereby, be neglected, but might be adapted to the capacity of the group.

The work involved in mechanics and skilled trades includes occupations of every degree of complexity. The range of I. Q.'s in these distributions and the normality of the curves is, therefore, in keeping with life opportunities in these fields. In industry and in schools for vocational training we sometimes meet with an objection against the employment of inferior mentalities and high grade defectives, on the plea that they have not the capacity for normal advancement. The assumption here is, that when these individuals reach the plateau of their learning curves, they naturally become discontented. Experience with mental defectives does not bear out this assumption. There are stable and unstable temperaments in every degree of general intelligence. The latter, when combined with mental defects are subjects for institutional care. The former are well content in occupations which to higher mentalities are blind alley jobs. They labor happily and efficiently in routine work in which the constant repetition required is galling to more active minds. This confusion of temperamental with intellectual qualification is the cause of much unwisdom in vocational training and in industrial organization. Objective tests for character traits are now of special interest in psychological experimentation and will presumably meet the need for more intensive character study in schools and in industries.

The experiment conducted by Elizabeth B. Bigelow(25) at New Haven, Connecticut, offers proof of the stability of sub-normal girls in industry. The success of the parole system as worked out by Dr. Bernstein(26) is another instance of extra-institutional control. Dr. Gesell(27) suggests adjustment by means of more adequate legislation for parole systems.

Industrial stability in relation to intelligence, on the basis of school retardation, used as the only available measure, has been studied by W. D. Scott and M. H. S. Hayes. (31; p. 70 ff.) They considered the expressed desires for change of work of 470 employees divided among six departments of a manufacturing company.

When the results for the six departments are plotted in one curve, a steady rise in dissatisfaction as retardation grows less

is shown. When each department is studied separately the results are in marked agreement with the degree of intelligence required by the different types of work of the departments. For instance (31, p. 76): "In both the foundry and the gear and lathe departments, the men who are the most retarded are the most satisfied with their work; the men who are least retarded are almost equally content. The greatest instability is found among those who occupy a middle ground in the matter of retardation. This curious fact may be understood when it is realized that in these two departments there are both very low-grade and very high-grade jobs."

Workingmen of high intelligence are as likely to be discontented as those of low intelligence in situations which do not offer scope for the exercise of their capacities.

#### CONCLUSIONS

1. Interests are not conditioned by intelligence except in so far as intelligence limits comprehension in the fields of interest.
2. Of the children considered in this investigation, those planning to go to high school have a median I. Q. of 101.7—. This indicates that 50 per cent of probable high school entrants have not the necessary intelligence to cope with the academic requirements for graduation.
3. Of the children planning for part time secondary education 25 per cent have sufficient intelligence to become high school graduates. These cases should be studied with a view to giving opportunity to complete the high school course without economic handicaps.
4. Of the children planning to go to work without further school training approximately 15 per cent have the mental ability to become high school graduates.
5. The groups of boys planning to go to work without further school plans or planning for part time secondary education, show a somewhat greater variability than the corresponding groups of girls; whereas the group of girls planning to go to high school is more variable than the corresponding group of boys.

6. The percentage of boys going to work or planning for part time secondary education is 73 per cent of the total number in contrast to 60 per cent of the corresponding group of girls.

7. There is a high degree of correspondence between success in the Pintner Non-Language Scale and interest in occupations involving manual ability.

8. Approximately equal numbers of children express interest in skilled trades, mechanics, clerical, and professional work. Skilled trades and mechanics show similar curves and almost equal central tendencies. Prospective clerical workers include some of the highest I. Q.'s, and their central tendency is higher than that of mechanics or skilled trades. Prospective professional workers show a slight advance in central tendency, but include children of all degrees from border-line to superior adult. The overlapping of the four curves indicates the need for work along the lines of vocational orientation and guidance beginning in the intermediate grades of the elementary school.

9. Over half of the children have not learned to associate the idea of their favorite occupations with the idea of life work, while approximately 70 per cent have definite ideas as to the nature of the occupation by which they expect to make a living.

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